

**Amendments to the Claims:**

Claims 1-3, 6, 10, 43, 46-48, 54, and 58-61 have been amended herein. Please note that all claims currently pending and under consideration in the above-referenced application are shown below. Please enter these claims as amended. This listing of claims will replace all prior versions and listings of claims in the application.

**Listing of Claims:**

1. (Currently Amended) A G-protein fusion receptor comprising:
  - a) an extracellular domain comprising an extracellular domain amino acid sequence at least 75% identical to either an extracellular ~~CaR~~ calcium receptor ("CaR") amino acid sequence, an extracellular ~~mGluR~~ metabotropic glutamate receptor ("mGluR") amino acid sequence, or an extracellular ~~GABA<sub>B</sub>-receptor~~ γ-aminobutyric acid receptor ("GABA<sub>B</sub>R") amino acid sequence, wherein said extracellular domain is capable of binding a native CaR, mGluR, or ~~GABA<sub>B</sub>-GABA<sub>B</sub>R~~ ligand;
  - b) a transmembrane domain joined to the carboxy terminus of said extracellular domain, said transmembrane domain comprising a transmembrane domain amino acid sequence at least 75% identical to either a transmembrane CaR amino acid sequence, a transmembrane mGluR amino acid sequence, or a transmembrane ~~GABA<sub>B</sub>-receptor~~ GABA<sub>B</sub>R amino acid sequence;
  - c) an intracellular domain joined to the carboxy terminus of said transmembrane domain comprising all or a portion of an intracellular amino acid sequence at least 75% identical to either an intracellular CaR amino acid sequence, an intracellular mGluR amino acid sequence, or an intracellular ~~GABA<sub>B</sub>-receptor~~ GABA<sub>B</sub>R amino acid sequence, provided that said portion is at least 10 amino acids;
  - d) an optionally present linker joined to the carboxy terminus of said intracellular domain; and
  - e) a G-protein joined either to said intracellular domain or to said optionally present linker, provided that said G-protein is joined to said optionally present linker when said

optionally present linker is present, wherein said G-protein interconverts between a GDP bound and a GTP bound form,  
wherein said domains are functionally coupled such that a signal from the binding of a ligand is transduced to the intracellular domain when said G-protein fusion receptor is present in a suitable host cell, and wherein said intracellular domain when present in a wild type receptor does not interact with said G-protein.

2. (Currently Amended) The G-protein fusion receptor of claim 1, wherein said extracellular domain consists of said extracellular domain amino acid sequence, said transmembrane domain consists of said transmembrane domain amino acid ~~sequence~~; sequence, and said intracellular domain consists of said intracellular domain amino acid sequence.

3. (Currently Amended) The G-protein fusion receptor of claim 2, wherein said optionally present linker is present and is a polypeptide 3 amino acids to 30 amino acids in length.

4. (Original) The G-protein fusion receptor of claim 2, wherein said optionally present linker is not present.

5. (Previously Presented) The G-protein fusion receptor of claim 3, wherein said G-protein is selected from the group consisting of:  $G\alpha_{15}$ ,  $G\alpha_{16}$ , Gqo5, and Gqi5.

6. (Currently Amended) The G-protein fusion receptor of claim 5, wherein any of said CaR amino acid sequence present is a human CaR amino acid sequence, any of said mGluR amino acid sequence present is from a human mGluR, and any of said ~~GABA<sub>B</sub>-receptor~~ GABA<sub>B</sub>R amino acid sequence present is from human ~~GABA<sub>B</sub>-receptor~~ GABA<sub>B</sub>R.

7. (Previously Presented) A nucleic acid comprising a nucleotide sequence encoding for the G-protein fusion receptor of any one of claims 1-6, 42, or 43.

8. (Previously Presented) An expression vector comprising a nucleotide sequence encoding for the G-protein fusion receptor of any one of claims 1-6, 42, or 43 transcriptionally coupled to a promoter.

9. (Previously Presented) A recombinant cell comprising the expression vector of claim 8 and a cell wherein the G-protein fusion receptor is expressed and is functional.

10. (Currently Amended) A recombinant cell produced by combining ~~a~~an expression vector of claim 8, wherein said expression vector comprises the nucleic acid of claim 7 and elements for introducing heterologous nucleic acid into a cell wherein the G-protein fusion receptor is expressed, and said cell.

11. (Previously Presented) A process for the production of a G-protein fusion receptor comprising:  
growing procaryotic or eukaryotic host cells comprising a nucleic acid sequence expressing the G-protein fusion receptor of any one of claims 1-6, 42, or 43, under suitable nutrient conditions allowing for cell growth.

12-41. (Canceled)

42. (Previously Presented) The G-protein fusion receptor of claim 4, wherein said G-protein is selected from the group consisting of  $G\alpha_{15}$ ,  $G\alpha_{16}$ , Gqo5, and Gqi5.

43. (Currently Amended) The G-protein fusion receptor of claim 42, wherein any of said CaR amino acid sequence present is a human CaR sequence, any of said mGluR amino acid sequence present is from a human mGluR, and any of said ~~GABA<sub>B</sub>-receptor~~ GABA<sub>B</sub>R amino acid sequence present is from human ~~GABA<sub>B</sub>-receptor~~ GABA<sub>B</sub>R.

44. (Previously Presented) The G-protein fusion receptor of claim 1, wherein said intracellular domain has at least 90% sequence identity with a portion of a CaR intracellular domain sequence at least 50 amino acids in length.

45. (Previously Presented) The G-protein fusion receptor of claim 1, wherein said intracellular domain has at least 90% sequence identity with a portion of a mGluR intracellular domain sequence at least 50 amino acids in length.

46. (Currently Amended) The G-protein fusion receptor of claim 1, wherein said intracellular domain has at least 90% sequence identity with a portion of a ~~GABA<sub>B</sub> receptor~~ GABA<sub>B</sub>R intracellular domain sequence at least 50 amino acids in length.

47. (Currently Amended) The G-protein fusion receptor of claim 1, wherein said extracellular domain and said transmembrane domain have at least 75% sequence identity with an mGluR extracellular domain and transmembrane domain or a ~~GABA<sub>B</sub> receptor~~ GABA<sub>B</sub>R extracellular domain and transmembrane domain, said intracellular domain has at least 75% sequence identity with a CaR intracellular amino acid sequence, and said G-protein couples to phospholipase C.

48. (Currently Amended) The G-protein fusion receptor of claim 47, wherein said extracellular domain and said transmembrane domain are from a Type 2 ~~mGluR~~ mGluR.

49. (Previously Presented) The G-protein fusion receptor of claim 47, wherein said extracellular domain and said transmembrane domain are from a Type 3 mGluR.

50. (Previously Presented) The G-protein fusion receptor of claim 47, wherein said extracellular domain and said transmembrane domain are from a Type 4 mGluR.

51. (Previously Presented) The G-protein fusion receptor of claim 47, wherein said

extracellular domain and said transmembrane domain are from a Type 6 mGluR.

52. (Previously Presented) The G-protein fusion receptor of claim 47, wherein said extracellular domain and said transmembrane domain are from a Type 7 mGluR.

53. (Previously Presented) The G-protein fusion receptor of claim 47, wherein said extracellular domain and said transmembrane domain are from a Type 8 mGluR.

54. (Currently Amended) The G-protein fusion receptor of claim 47, wherein said extracellular domain and said transmembrane domain are from a ~~GABA<sub>B</sub>-receptor~~GABA<sub>B</sub>R.

55. (Previously Presented) The G-protein fusion receptor of claim 1, wherein said G-protein is a chimeric G-protein.

56. (Previously Presented) The G-protein fusion receptor of claim 47, wherein said G-protein is a chimeric G-protein.

57. (Previously Presented) A G-protein fusion receptor comprising:
- a) an extracellular domain comprising an extracellular domain amino acid sequence at least 90% identical to an extracellular mGluR amino acid sequence wherein said extracellular domain is capable of binding a native mGluR ligand;
  - b) a transmembrane domain joined to the carboxy terminus of said extracellular domain, said transmembrane domain comprising a transmembrane domain amino acid sequence at least 90% identical to a transmembrane mGluR amino acid sequence, or a transmembrane CaR amino acid sequence;
  - c) an intracellular domain joined to the carboxy terminus of said transmembrane domain comprising all or a portion of an intracellular amino acid sequence at least 90% identical to an intracellular CaR amino acid sequence, provided that said portion is at least 10 amino acids;

- d) an optionally present linker joined to the carboxy terminus of said intracellular domain;  
and
- e) a G-protein joined either to said intracellular domain or to said optionally present linker, provided that said G-protein is joined to said optionally present linker when said optionally present linker is present, wherein said G-protein interconverts between a GDP bound and a GTP bound form.

58. (Currently Amended) The G-protein fusion receptor of claim 57, wherein said transmembrane domain comprises a transmembrane domain amino acid sequence at least 90% identical to a transmembrane mGluR amino acid sequence.

59. (Currently Amended) The G-protein fusion receptor of claim 57, wherein said transmembrane domain comprises a transmembrane domain amino acid sequence at least 90% identical to a transmembrane CaR amino acid sequence.

60. (Currently Amended) A G-protein fusion receptor comprising:
- a) an extracellular domain comprising an extracellular domain amino acid sequence at least 90% identical to an extracellular ~~GABA<sub>B</sub>-receptor~~GABA<sub>B</sub>R amino acid sequence wherein said extracellular domain is capable of binding a native GABA<sub>B</sub> ligand;
  - b) a transmembrane domain joined to the carboxy terminus of said extracellular domain, said transmembrane domain comprising a transmembrane domain amino acid sequence at least 90% identical to either a transmembrane CaR amino acid sequence, or a transmembrane ~~GABA<sub>B</sub>-receptor~~GABA<sub>B</sub>R amino acid sequence;
  - c) an intracellular domain joined to the carboxy terminus of said transmembrane domain comprising all or a portion of an intracellular amino acid sequence at least 90% identical to an intracellular CaR amino acid sequence, provided that said portion is at least 10 amino acids;
  - d) an optionally present linker joined to the carboxy terminus of said intracellular domain;  
and

- e) a G-protein joined either to said intracellular domain or to said optionally present linker, provided that said G-protein is joined to said optionally present linker when said optionally present linker is present, wherein said G-protein interconverts between a GDP bound and a GTP bound form.

61. (Currently Amended) The fusion receptor of claim 60, wherein said transmembrane domain comprises a transmembrane domain amino acid sequence at least 90% identical to a transmembrane ~~GABA<sub>B</sub> receptor~~ GABA<sub>B</sub>R amino acid sequence.

62. (Previously Presented) The fusion receptor of claim 60, wherein said transmembrane domain comprises a transmembrane domain amino acid sequence at least 90% identical to a transmembrane CaR amino acid sequence.